

# 1     **LOCKING DEVICE TO SECURE A TELESCOPIC TUBE ASSEMBLY**

## 2     BACKGROUND OF THE INVENTION

### 3     1. Field of the Invention

4             The present invention relates to a locking device, and more particularly  
5     to locking device to secure an inner tube in an outer tube of a telescopic tube  
6     assembly.

### 7     2. Description of Related Art

8             With reference to Fig. 6, a conventional locking device (50) for a  
9     telescopic tube assembly having an outer tube (40) and an inner tube (41)  
10    slidably received in the outer tube (40) includes a knob (51) rotatably mounted  
11    on a side of the locking device (50).

12            When the relative position of the inner tube (41) is to be readjusted, the  
13    operator has to hold the inner tube (41) to prevent the inner tube (41) from  
14    slipping too far into the outer tube (40). Then the operator is able to unscrew the  
15    knob (51) and change the relative position of the inner tube (41) to the outer tube  
16    (40). However, when a distal end of the inner tube (41) is provided with a heavy  
17    load, i.e. an illuminating device, the operator has to struggle to hold the weight of  
18    the illuminating device. Therefore, assistance from the other operators is  
19    essential. That is, it is almost impossible for a lone operator to finish the  
20    adjustment of the telescopic tube assembly, especially when a weighty object is  
21    on top of the telescopic tube assembly.

22            To overcome the shortcomings, the present invention tends to provide an  
23    improved locking device to mitigate the aforementioned problems.

1     SUMMARY OF THE INVENTION

2             The primary objective of the present invention is to provide an improved  
3     locking device to enable a lone operator to safely finish the adjustment of the  
4     relative position of the inner tube relative to the outer tube.

5             Another objective of the present invention is to eliminate danger to the  
6     operator by providing a safety device to prevent excessive movement of the  
7     inner tube relative to the outer tube.

8             Other objects, advantages and novel features of the invention will  
9     become more apparent from the following detailed description when taken in  
10    conjunction with the accompanying drawings.

11    BRIEF DESCRIPTION OF THE DRAWINGS

12            Fig. 1 is perspective view of the locking device applied on a telescopic  
13    tube assembly;

14            Fig. 2 is schematically cross sectional view of the locking device in Fig.  
15    1;

16            Fig. 3 is a schematic view showing the operation of the locking device of  
17    the present invention;

18            Fig. 4 is a schematic view showing the application of the locking device;

19            Fig. 5 is a schematic view showing an illuminating device is mounted on  
20    the telescopic assembly with the locking device of the present invention applied  
21    thereto; and

22            Fig. 6 is side view showing a conventional locking device applied to a  
23    telescopic tube assembly.

24    DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

1           With reference to Figs. 1 and 2, a telescopic tube assembly includes an  
2   outer tube (10) and an inner tube (11) slidably received in the outer tube (10).  
3   The inner tube (11) has multiple adjusting recesses (111) defined in an outer  
4   periphery of the inner tube (11) and a guiding groove (112) defined on the outer  
5   periphery of the inner tube (11) along a longitudinal axis of the inner tube (11).

6           A locking device in accordance with the present invention includes an  
7   enclosure (20) partially securely mounted on a peripheral edge of the outer tube  
8   (40) and having a guide (201) formed on an inner face of the enclosure (20), a  
9   first space (21) defined in a side face of the enclosure (20), a first hole (22)  
10   defined through a bottom face defining the first space (21), a second hole (23)  
11   defined through the enclosure (20) to be opposite to the first hole (22) and a  
12   second space (24) defined to communicate with the second hole (23).

13          Furthermore, a lever (25) is received in the first space (21) and a pin (not  
14   shown) is extended through the lever (25) and into opposite side face defining  
15   the first space (21) to allow the lever (25) to be pivotally received in the first  
16   space (21). A positioning rod (26) is provided with a first distal end securely  
17   connected to a side of the lever (25) and a second distal end. The second distal  
18   end of the positioning rod (26) is provided with a head (261) corresponding to  
19   the adjusting recesses (111). A spring (262) is mounted on the positioning rod  
20   (26) and compressibly received in the first hole (22) such that when the  
21   positioning rod (26) is moved by the lever (25), the spring (262) is able to  
22   provide a recoil force to the positioning rod (26) to return the positioning rod  
23   (26). A knob (27) having a bolt (271) integrally formed with the knob (27) is  
24   screwingly extended into the second hole (23) to abut an abutting block (28)

1 received in the second space (24) so that the outer periphery of the inner tube (11)  
2 is engaged by the abutting block (28). Especially, a safety device is mounted on  
3 the outer periphery of the inner tube (11) to prevent excessive movement of the  
4 inner tube (11) relative to the outer tube (10).

5 With reference to Fig. 3, it is noted that before the locking device of the  
6 present invention is in application, the head (261) of the positioning rod (26) is  
7 received in one of the adjusting holes (111) so as to secure the position of the  
8 inner tube (11) relative to the outer tube (10). When the lever (25) is depressed,  
9 the positioning rod (26) leaves the corresponding adjusting recess (111) to allow  
10 the operator to adjust the relative position of the inner tube (11) to the outer tube  
11 (10). After adjustment of the relative position of the inner tube (11) to the outer  
12 tube (10), the spring (262) provides a recoil force to the positioning rod (26) to  
13 force the positioning rod (26) to return to its original position such that the head  
14 (261) of the positioning rod (26) is received in a corresponding one of the  
15 adjusting recesses (111) of the inner tube (11) and the adjustment of the  
16 telescopic tube assembly is accomplished.

17 However, during the adjustment of the telescopic tube assembly, the  
18 operator is able to use the abutting block (28) to secure the position of the inner  
19 tube (11) in the outer tube (10). That is, the operator is able to use the abutting  
20 block (28) to increase the friction between the abutting block (28) and the outer  
21 periphery of the inner tube (11) by rotating the knob (27) such that the position of  
22 the inner tube (11) in the outer tube (10) is temporarily secured. Alternatively,  
23 the operator is able to use the abutting block (28) as an auxiliary securing device  
24 to secure the position of the inner tube (11) relative to the outer tube (10).

1           Further, the guide (201) slidable in the guiding groove (112) is able to  
2 smoothen the sliding movement of the inner tube (11) to the outer tube (10).

3           Preferably, the safety device (12) which is mounted on the outer  
4 periphery of the inner tube (11) is a boss. The boss (12) is integrally formed on  
5 the outer periphery of the inner tube (11) such that excessive sliding movement  
6 of the inner tube (11) relative to the outer tube (10) is prevented.

7           With reference to Figs. 4 and 5, it is noted that when a loudspeaker (31)  
8 or an illuminating device (32) is mounted on top of the free end of the inner tube  
9 (11), the locking device of the present invention is able to safeguard the operator  
10 from possible injury by the sudden falling of the inner tube (11) due to the weight  
11 on top of the telescopic tube assembly.

12           It is to be understood, however, that even though numerous  
13 characteristics and advantages of the present invention have been set forth in the  
14 foregoing description, together with details of the structure and function of the  
15 invention, the disclosure is illustrative only, and changes may be made in detail,  
16 especially in matters of shape, size, and arrangement of parts within the  
17 principles of the invention to the full extent indicated by the broad general  
18 meaning of the terms in which the appended claims are expressed.